

perature and heat, properties of steam, and work, &c., all very thorough and very full of matter for careful thought.

In the chapter on the $\theta\phi$ diagrams, more advanced theory is taken up; and, in fact, there are several chapters here that will be above the average student, and will form good reading for the expert; the facts are marshalled with great skill, and the deductions show that the author is a thorough master of his subject.

The chapters on valve motion problems and inertia of moving parts are good, and the methods adopted to deal with these very difficult problems are as simple as it is possible for them to be.

Though only forty-two pages are devoted to gas and oil engines, the author has managed to get in a great amount of most useful information, and to give all that the general student needs.

The remaining chapters are devoted to certain important thermodynamic problems and to an inquiry into the properties of superheated steam.

Most certainly Prof. Perry has produced a text-book which must be on the shelf of every student of applied thermodynamics, and of every engineer who has to deal with the utilisation of energy. H. B.

OUR BOOK SHELF.

Practical Plane and Solid Geometry for Advanced Students; including Graphic Statics. By J. Harrison, M.I.M.E., and G. A. Baxandall. Pp. xii + 558. (Macmillan and Co., 1889.)

THIS book appears to compare very favourably with most English works of its class. The greater part of it deals with practical solid geometry, including the method of indexed plans; this subject is treated in a much more methodical way than is usually the case, and the authors very properly call attention from time to time to constructions which are of a fundamental character. It is a pity they did not go further, and clearly distinguish throughout the book the worked examples which involve new points of theory from those which merely illustrate general constructions previously given. The directions for making cardboard models ought to be very useful to the student; and the constructions are explained in such a way as to make the reasons for them intelligible. The section on plane geometry is distinctly above the average; in particular, there is a very interesting discussion of the description of an ellipse by means of a paper trammel. Of graphical statics only a brief outline is given; but it is useful enough so far as it goes. There is one error to which attention ought to be drawn: on p. 342 it is stated that the tangent plane to a surface at an anticlastic point cuts the surface in a curve with a double point *where there are two inflexions*: this is not generally the case, and, in fact, the anchor-ring gives an example of the contrary. Here the section is a bicircular quartic which has a real ordinary node when the tangent plane cuts the ring, and is not parallel to the polar axis.

Grundlinien der maritimen Meteorologie. By W. Köppen. Pp. vi + 83. (Hamburg: G. W. Hiemeyer, 1899.)

THIS little work serves two purposes; it is practically a concise elementary meteorology, and a guide for the use of sailors, showing the best routes in the different oceans, with directions for the management of vessels in storms, especially the dangerous West India hurricanes and the typhoons of the China seas. Dr. Köppen has been known for many years as one of the most prominent meteorologists, and having access to the large amount of materials collected by the Deutsche Seewarte, we might

expect to find the result of his long experience embodied in a useful and an attractive form. The work meets our expectations in every way; all details which are unnecessary for the object in view have been carefully excluded, while all technical and nautical expressions are fully explained, so that the work, which is specially written for seamen, may be read with interest and advantage by all who are desirous of obtaining a knowledge of maritime meteorology. His treatment of the subject includes the general circulation of the atmosphere, as well as the movements of waves, tides and ocean currents, and the value of the treatise is much enhanced by explanatory figures in the text and by separate charts and diagrams.

Inorganic Chemical Preparations. By Felix Lengfeld. Pp. xviii + 57. (New York: The Macmillan Company. London: Macmillan and Co., Ltd., 1899.)

THIS is a compact series of instructions for the preparation of typical inorganic compounds, the selection of which seems to have been very judiciously made. References to original literature are given in connection with each preparation. The author takes care to explain "that the manual is merely a laboratory guide, and that unless the work is carefully supervised, it may become purely mechanical, and the course lose half its value." It is, in fact, a series of recipes, and no attempt is made to explain the innumerable difficulties that will confront the inexperienced worker. This is not said by way of complaint; on the contrary, it is the incidental and unexpected difficulties of an operation rather than the plain sailing that give the operator occasion to think, and lead to the close association of the teacher with the mind of the learner.

Mr. Lengfeld purposely refrains from giving a complete list of references to literature, being of opinion that the student should learn to use dictionaries of chemistry. It is doubtful, however, whether the student is able to make a discreet choice from the innumerable references of a dictionary, and we think that the author has rather lost an opportunity in not making his list of references more ample. To those teachers who are introducing more inorganic preparation work into their courses, this book is likely to prove welcome. A. S.

The Utility of Sulphate of Ammonia in Agriculture. By James Muir, M.R.A.C. Pp. 68. (London: Sulphate of Ammonia Committee, 4 Fenchurch Avenue, E.C., 1899.)

THIS is the essay which won the prize lately offered by the Sulphate of Ammonia Committee. Mr. Muir has carefully compiled his little treatise, and made a judicious selection of results of field experiments to illustrate the use of sulphate of ammonia, and to compare its results with those obtained from the use of nitrate of soda. Naturally, the results of the Rothamsted experiments are those most largely drawn upon; Woburn is also quoted from to a considerable extent, and the author considerably always gives references to his authorities. The comparisons between the effects of nitrate of soda and sulphate of ammonia are fully and very fairly drawn, and the farmer should find the essay a great help in deciding which of these nitrogenous manures to apply in any particular case. No doubt the farmer, for whom the essay is chiefly written, will turn to the last three pages, which contain a summary of conclusions and comparisons between the two important nitrogenous manures. This summary is in twenty-seven paragraphs, and but few of these lay themselves open to criticism. We can only suggest that the author might have pointed out more clearly in this summary, paragraph 3, that leguminous plants can, under favourable conditions, make use of free nitrogen; paragraph 7, that nitrogenous manures, and especially ammoniacal manures, do not give their best

results unless plenty of ash constituents are present, phosphates as well as potash; paragraph 20, that phosphates are a highly desirable addition in the manuring of barley; and paragraphs 24 and 27, that both phosphates and potash should be used on potatoes and on grass-land when sulphate of ammonia is used to supply nitrogen.

The Committee is to be congratulated on having secured and published a very useful and very justly written essay.

Euclid. Books I.-IV. Edited by Charles Smith and Sophie Bryant. Pp. viii + 288. (London: Macmillan and Co., 1899.)

WITH this book we have another addition to the great number of text-books on the Elements of Geometry. Its chief features seem to be that the editors endeavour to instil into the students the notion that it is the correct reasoning and proof of the propositions which should be mastered, and not so much an exact repetition of the words of the text-book or teacher.

Abbreviations are freely used early in the first book, and these should be adopted generally by beginners, as the reasoning of a proof can be more easily scanned. The editors have in several cases departed from Euclid's solutions and adopted in their stead more modern and simple methods. Included in the text are many examples, both original and selected, from mathematical journals and examination papers. In this form the Elements should be found useful in many schools.

Sylvia in Flowerland. By Linda Gardiner. Pp. 198. (London: Seeley and Co., Ltd., 1899.)

AN attempt is here made to employ the methods of Lewis Carroll in the teaching of botany. In the first chapter the foxglove explains: "This is Leap Year with us (the flowers), and so we have a thirty-first of June," and because the thirty-first of June does not occur every year, it is a day of special favour to humans, who are allowed "to hear with both eyes and ears." Sylvia talks with plant after plant, and is instructed by them in the fascinating mysteries of cross-pollination and many other interesting questions of plant-life. The jam is sometimes scarcely thick enough to hide the powder; but we have little doubt that the volume will find many appreciative readers.

Magnetism and Electricity. By J. Paley Yorke. Pp. viii + 264. (London: Edward Arnold, 1899.)

MR. YORKE'S object is to provide an introduction to this branch of physics for those students who already possess some acquaintance with general elementary science. His treatment is non-mathematical, and no precise instructions are given for experimental work. It is a little difficult to understand the reason for the interpolation of chapter v., headed "Electricity," between the subjects of magnetism and the study of electric currents, more especially as the subject of electrostatics is resumed in chapter xii. The explanations are clear and simple, and the book should give an intelligent reader sound preliminary conceptions of an important subject.

Field and Folklore. By Harry Lowerison. With a chapter on Folklore by Alfred Nutt. Pp. vii + 77. (London: David Nutt, 1899.)

THE collection of short essays on various aspects of nature-study collected here should do a great deal towards enlisting the sympathy of school teachers in developing a love in their pupils for outdoor observations of animal and plant-life. Mr. Lowerison gives, in an informal way, a series of useful hints as to how to set about observing nature, and what books to consult to find the explanation of observations which are not at first easily understood. Mr. Nutt's chapter describes the scope of folklore and the aims of students of this department of knowledge.

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LETTERS TO THE EDITOR.

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The Stockholm Conference on the Exploration of the Sea.

I CANNOT refrain from addressing to you a few words in support of Prof. Herdman's remarks on the outcome of the Stockholm Conference. With marine biology so eminently represented at the meetings, there was ground for an expectation that the report would contain primarily recommendations for work at sea. The representatives of chemical and physical work appear to have known their minds and to have obtained the just recognition of their claims.

Hitherto in biological investigation work has been too exclusively devoted to the food fishes themselves—too little to the food of these fishes—far too little to their biological environment. It will be to many eager students, both of fishery affairs and marine biology, a matter of dismay if nothing more definite results from this Conference. There are, and have been, too many committees, secretaries and bureaux engaged on this subject. As Prof. Herdman says, we want work at sea. To be precise, we want, to begin with, two well-equipped trawlers and the right men in them. If the Stockholm Conference had recommended even one, it would have been a sign of grace. Such boats are not mere scientific instruments—not merely the luxuries afforded by governments in times of prosperity—but sound financial investments in fishery affairs. The Norwegian Government has, I understand, ordered one, admirably devised for marine investigation.

GEORGE MURRAY.

November 25.

Bust of Sir George Stokes.

YOU were kind enough to say last June that Mr. Hamo Thornycroft would undertake the production of bronze copies of the presentation bust of Sir George Stokes, about one-third of the size of the original, at a cost of seven guineas each, in case twenty-five were ordered, and that names would be received by Sir William Crookes and myself.

If anybody wants such a copy I hope that he will write to me at once.

JOHN PERRY.

Royal College of Science, London, South Kensington, S.W.,
November 22.

A Geometric Determination of the Median Value of a System of Normal Variants, from two of its Centiles.

A SHORT account appeared in NATURE, October 12, p. 584, of a paper read by me at the British Association, entitled the "Median Estimate," which will appear in the forthcoming Journal of the Association. Its object was to solve a problem of the following kind:—40 per cent. of the members at a meeting vote that a proposed grant should be less than 100%, 80 per cent. vote that it should exceed 500%. What is the Median Estimate, supposing the normal law of frequency to hold good? That is to say, What is the sum that one-half of the members would think too little, and the other half too much, and which therefore presents the best compromise between many discordant opinions? I showed that the calculation was exceedingly simple if certain tabular values are used that will be spoken of later. But, on after reflection, it seems to me that further simplification is both desirable and feasible. The problem is representative of a large class of much importance to anthropologists in the field, few of whom appear to be quick at arithmetic or acquainted even with the elements of algebra. They often desire to ascertain the physical characteristics of races who are too timorous or suspicious to be measured individually, but who could easily be dealt with by my method. Suppose it to be a question of strength, as measured by lifting power, and that it has been ascertained that *a* per cent. of them fail to lift a certain bag A of known weight, and that *b* per cent. of them fail to lift another heavier bag B. From these two data, the median strength can be determined by the simple method spoken of above, and not only it but also the distribution of strengths among the people. Having indicated